

Oct. 9, 1928.

1,687,189

T. H. WITTLIFF

FURNITURE BRACE AND TENSIONING DEVICE

Filed Dec. 2, 1925

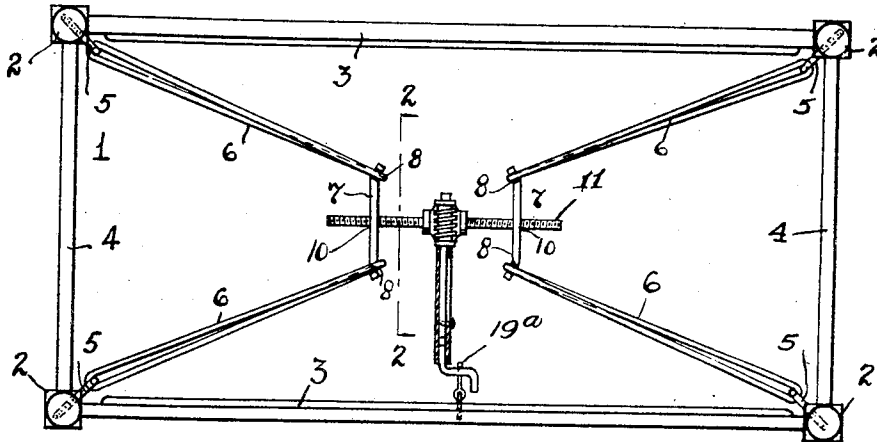


Fig. 1

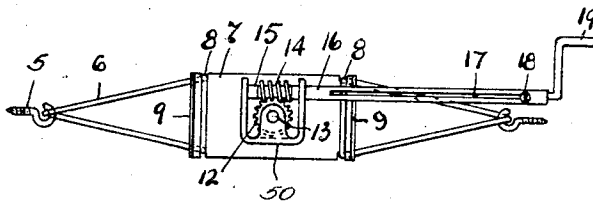


Fig. 2

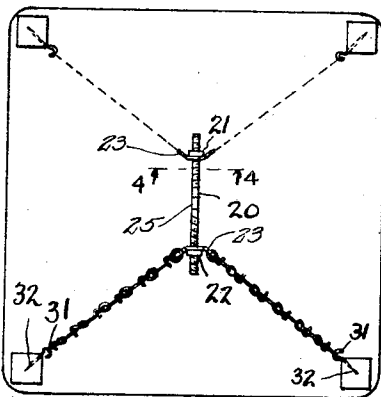


Fig. 3

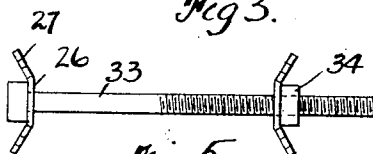


Fig. 5

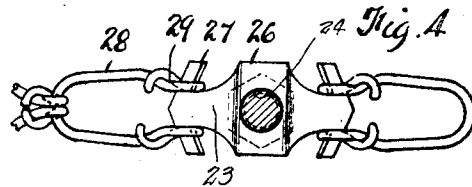


Fig. 4

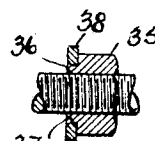


Fig. 7

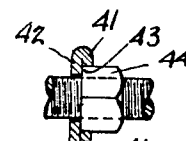


Fig. 8

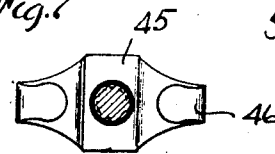


Fig. 6

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Patented Oct. 9, 1928.

1,687,189

UNITED STATES PATENT OFFICE.

THEODORE H. WITTLIFF, OF CLEVELAND, OHIO.

FURNITURE BRACE AND TENSIONING DEVICE.

Application filed December 2, 1925. Serial No. 72,730.

This invention as indicated relates to a furniture brace and tensioning device and is a continuation in part of my copending application, Serial No. 30,155, filed May 14, 1925. More particularly it comprises a furniture brace having flexible members adapted to be secured to the corner posts of an article of furniture and a tensioning device disposed centrally thereof. The tensioning device comprises a screw-threaded central member over which a pair of stamped metal plates are engaged with means for moving the same toward and away from each other. A worm-gear and operating crank may be provided for rotating the screw-threaded member, or a wrench or similar implement may be used for such purpose.

The device is adapted for use in connection with various articles of furniture but is particularly intended for use with beds and chairs.

The principal object of the invention is to simplify and cheapen the cost of manufacture of furniture braces for the purpose indicated. Another object of the invention is to provide means which may be shipped in knock-down form and readily assembled to produce an efficient furniture brace. A further object of the invention is to provide a crank operated worm gear for actuating the tensioning device so that the desired control of the same may be accomplished from a distant point such as a position adjacent side or end rails of a bed. Another object of the invention is to provide a tensioning device formed of stamped metal plates and standard nuts which co-act to form a satisfactory turnbuckle. Other objects of the invention will appear in the course of the following description.

The annexed drawing and the following description set forth in detail certain features embodying the invention, such disclosed means constituting, however, several of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings I therefore particularly point out the following:

Fig. 1 is a top plan view showing a construction embodying the principle of my invention; Fig. 2 is an end view taken along the line 2—2 shown in Fig. 1, looking in the direction of the arrows; Fig. 3 is a top plan view of a modified form of construction embodying the principle of my invention; Fig. 4 is a fragmentary view taken along the line

4—4 shown in Fig. 3 looking in the direction of the arrows; Fig. 5 is a top plan view showing the use of a bolt and nut of standard type in place of a turnbuckle member reversely screw-threaded at either end; Fig. 6 is an end view of a modified form of cable-engaging plate; Fig. 7 is a detail sectional view showing nut riveted to a cable-engaging plate; and Fig. 8 is a fragmentary view partly in section showing a nut engaging turned over edges of a cable-engaging plate.

As is clearly shown in Figs. 1 and 2 of the drawing a furniture brace embodying the principles of my invention is applied to the frame of a wooden bedstead. The corner posts 2 of said bedstead are joined by side rails 3 and end members 4. A hook 5 is placed diagonally through each corner post and flexible members preferably in the form of loops 6 are engaged over said respective hooks at their outer ends, and at their inner ends are engaged over rectangular plates 7 provided with notches 8 on their longer sides adjacent their ends, of a size suitable to receive said flexible members.

The ends 9 of the plates may be bent away from said posts at a slight angle so as to permit the flexible elements to pull at substantially right angles to their point of attachment. Each of the plates is provided with a central aperture 10 which is correspondingly screw-threaded to engage the adjacent ends of the tensioning shaft 11. The means for operating the tensioning shaft is clearly disclosed in Fig. 2 and comprises a worm wheel 12 rigidly secured to the shaft 13 and having its peripheral teeth engaged with a worm 14 carried at the outer end of a telescopic crank shaft 15. The crank shaft is provided with sleeve 16 having a longitudinal slot 17 engaged over a screw 18 which serves as a guide pin and limiting stop. The outer end of the sleeve has a crank handle 19 firmly engaged therewith. The telescopic crank shaft need be only of sufficient length, when extended, to be conveniently operable at the side or end of the bedstead, or other article of furniture to which it is applied. The worm is held in engagement with the worm wheel by means of a stirrup plate 50 having upwardly turned ears, suitably apertured to fit over the shaft 15 on either side of the worm. While the frictional engagement of the worm and worm wheel may be adequate to maintain the crank arm in a horizontal position beneath the bedstead, it may be found

desirable to hook the outer end of the crank onto the adjacent side rail by means of a pivoted hook 19^a or a similar device, as is clearly shown in Fig. 1.

In the form of construction shown in Fig. 3, the device is illustrated as applied to a chair. In said construction the central tensioning member comprises a shaft 20 reversely screw-threaded at its opposite ends and engaged by suitably screw-threaded nuts 21, 22. The nuts are adapted to seat against the outer faces of plates 23 which are provided with central apertures 24 affording adequate clearance and are engaged over the central shaft. A squared central area 25 on the shaft provides for the tensioning of the device by means of a wrench or similar implement.

The construction of the plates in the modified form of device for engaging the flexible members is more particularly shown in Fig. 4 of the drawing. Each plate comprises a body portion 26 of sheet metal bent rearwardly adjacent each of its ends and having the side edges adjacent said ends notched so as to provide arrowhead terminals 27. A terminal link 28, comprising a length of wire bent U-shaped and having a loop 29 at either end, is connected with the adjacent arrowhead through the engagement of said loops over the projecting wings of said arrowhead portion of the plate. The links 31 at the opposite ends of the chain are engaged with the hooks 32 inserted diagonally through the end posts of the chair frame.

It is obvious that flexible elements other than chains may be used, such as wires, twisted cables and the like, and the term flexible members, or cables, is to be understood as covering all forms of flexible connecting members.

In place of the double ended central shaft, a bolt 33 and nut 34 of standard design, as is shown in Fig. 5, may be used.

When the form of tensioning device shown in Fig. 5 is used, a wrench is applied either to the nut or bolt head and the other of said elements is held against rotation until the proper amount of tension is applied.

In the construction shown in Fig. 3, the nuts bear with two of their side faces parallel to the ends of the plate against the flattened central portions of the plate. However, when the nuts are turned their corners tend to ride over the inclined rearwardly bent portions of the outer faces of the plates and thus offer a certain degree of opposition to the rotation of the nut having also to a certain extent the function of a lock nut.

In the form of construction shown in Figs. 7 and 8 means is provided for positively engaging the nut with the adjacent plate. In the form shown in Fig. 7 the nut 35 is provided with an extension collar 36 which is riveted through an enlarged aperture 37 in the plate 38. In the form of construction

shown in Fig. 8 the edges 41 of the plate 42 adjacent the central portion are bent inwardly upon themselves so as to provide a seat 43 equal to the shorter diameter of the nut 44 so that the nut may be locked against rotation when engaged between such over-turned edges. Obviously the plate and nut may be readily separated when the tension upon device is relieved.

A plate 45 of still another modified form is shown in Fig. 6. It is provided with a pair of hooks 46 on the central longitudinal line thereof. The hooks are formed from extensions of the body portion of the plate which is tapered toward either side and provided with extension ends of uniform width, which are bent inwardly so as to overlie such tapered portion.

When the form of construction shown in Figs. 1 and 2 is used, the requisite degree of tension is applied to the brace by means of the telescopic crank arm and worm gear. When a device of the construction shown in Fig. 3 is employed the preliminary amount of tension may be applied by screwing the nuts onto the shaft until light tension is applied to the device, and thereafter engaging a wrench with the squared central portion of the shaft to apply a higher degree of tension.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. A furniture brace comprising securing members attached to an article of furniture, flexible elements having terminal loops connected to said respective securing members, a central tensioning device comprising a screw-threaded shaft provided with a pair of screw-threaded members moveable relatively to each other, stamped metal plates centrally apertured and engaged over said shaft, and adapted to be seated against and interengage with said respective screw-threaded members, and integral hooks at the ends of each of said plates for interengaging with the loops of said flexible elements.

2. A furniture brace comprising securing members attached to an article of furniture, flexible elements having terminal loops connected to said respective securing members, a central tensioning device comprising a screw-threaded shaft provided with a pair of screw-threaded members moveable relatively to each other, stamped metal plates centrally apertured and engaged over said shaft and adapted to be seated against and interengage with said respective screw-threaded members and integral laterally projecting arrowhead terminals formed adjacent the ends of each of

said plates to engage with loops on said respective flexible elements.

3. A furniture brace comprising securing members attached to an article of furniture, flexible elements having terminal loops connected to said respective securing members, a central tensioning device comprising a screw-threaded shaft provided with a pair of screw-threaded members moveable relatively to each other, stamped metal plates centrally apertured to engage over said shaft and formed with arrowhead terminals for engaging said flexible members, through said terminal loops, a pair of ears on the lateral edges of each of said plates bent downwardly to engage said respective screw-threaded members to prevent rotation thereof independently of said plate, and means for rotating said screw-threaded shaft.

4. A tensioning device for furniture braces comprising flexible members, a tensioning member, a central shaft provided with reversely directed screw-threads at its opposite ends and with means centrally disposed for rotating said shaft, a pair of reversely screw-threaded nuts adapted to be engaged over the respective ends of said shaft, a pair of stamped metal plates centrally apertured to engage over said shaft, and provided with means to interengage with the adjacent nuts to prevent rotation thereof independently of said plates, arrowhead terminals formed integrally with each end of said plates, and a terminal chain link having its respective ends engaged over the ends of said arrowhead terminals and connected with said flexible members.

5. A furniture bracing device comprising

tension elements, an adjustable coupler member therefor comprising a coupler shank having its opposite end portions reversely threaded and having an intermediate shoulder portion for the engagement of a manipulating tool, nuts threaded to the shank end portions, connector members fitted to the shank inwardly of the nuts, said connector members being formed of stamped metal having a perforated central portion and end portions angularly disposed with relation thereto and said end portions having slots at their opposite sides to form key shoulders for engagement with the tension elements and said tension elements consisting of chain links having opposed loops interlocked in assembled engagement with said key shoulders.

6. A furniture bracing device comprising tension elements, an adjustable coupler member therefor comprising a coupler shank having its opposite end portions reversely threaded and having an intermediate portion for manipulating the same, nuts threaded to the shank end portions, connector members fitted to the shank inwardly of the nuts, said connector members being formed of stamped metal having a perforated central portion and end portions angularly disposed with relation thereto and said end portions having slots at their opposite sides to form key shoulders for engagement with the tension elements and said tension elements consisting of flexible members having open terminal portions interlocked in assembled engagement with said key shoulders.

Signed by me this 28th day of November, 1925.

THEODORE H. WITTLIFF.